SUMMARY OF EMISSIONS FROM THE BOLINAS LAGOON RESTORATION PROJECT

EMISSIONS UNDER THE RIPARIAN ALTERNATIVE

ACTIVITY COMPONENT	YEARS OF ACTIVITY	ANNUAL AVERAGE EMISSIONS, TONS PER YEAR				
		ROG	NOx	CO	SOx	PM10
DREDGING AND OCEAN DISPOSAL	9	2.83	55.47	11.38	14.00	2.71
LAND-BASED EXCAVATION	4	0.28	2.72	1.18	0.23	0.42
LANDFILL TRUCK TRAFFIC	4	0.18	0.74	0.85	0.05	0.39
MAXIMUM ANNUAL EMISSIONS		**3.29**	**58.93**	**13.41**	**14.28**	**3.52**

Dredging operations are expected to be limited to 1-2 months per year over a 9 year period.
Land-based excavation operations and associated landfill truck traffic are expected to be limited to 1-2 months per year over a 4 year period.

EMISSIONS UNDER THE ESTUARINE ALTERNATIVE

ACTIVITY COMPONENT	YEARS OF ACTIVITY	ANNUAL AVERAGE EMISSIONS, TONS PER YEAR				
		ROG	NOx	CO	SOx	PM10
DREDGING AND OCEAN DISPOSAL	9	2.85	55.73	11.43	14.06	2.73
LAND-BASED EXCAVATION	4	0.42	4.16	1.77	0.36	0.62
LANDFILL TRUCK TRAFFIC	4	0.29	1.20	1.38	0.07	0.63
MAXIMUM ANNUAL EMISSIONS		**3.56**	**61.10**	**14.59**	**14.50**	**3.99**

Dredging operations are expected to be limited to 1-2 months per year over a 9 year period.
Land-based excavation operations and associated landfill truck traffic are expected to be limited to 1-2 months per year over a 4 year period.

SUMMARY OF EMISSIONS FROM DREDGING OPERATIONS AND SEDIMENT DISPOSAL

DREDGING ELEMENT	DREDGED QUANTITY (cubic yards)	DREDGING DURATION (days)	TOTAL BARGE LOADS	BARGE DESTINATION	COMBINED DREDGE, TUGBOAT, AND AUXILIARY EQUIPMENT EMISSIONS, TONS				
					ROG	NOx	CO	SOx	PM10
North Basin	458,550	96	612	SFDODS	8.21	160.78	32.99	40.58	7.87
Pine Gulch Creek Delta, Riparian Alt.	149,100	32	199	SFDODS	2.67	52.32	10.73	13.20	2.56
Pine Gulch Creek Delta, Estuarine Alt.	155,950	33	208	SFDODS	2.79	54.66	11.21	13.79	2.67
Kent Island	376,750	79	506	SFDODS	6.79	132.91	27.27	33.55	6.51
Main Channel	216,250	46	289	SFDODS	3.88	75.96	15.58	19.17	3.72
Bolinas Channel	130,800	28	175	SFDODS	2.35	46.00	9.43	11.61	2.25
South Arm Channel	89,250	19	119	SFDODS	1.60	31.28	6.42	7.89	1.53
RIPARIAN ALTERNATIVE	1,420,700	300	1,900	SFDODS	25.50	499.25	102.42	125.99	24.43
ESTUARINE ALTERATIVE	1,427,550	301	1,909	SFDODS	25.62	501.59	102.90	126.58	24.55

Notes:

ROG = reactive organic gases
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter (below 50 microns aerodynamic equivalent diameter); the "10" in PM10 is a 50% mass collection efficiency size for sampling devices, not a size limit
SFDODS = San Francisco deep ocean disposal site
Emission estimates include hydraulic dredge operations and tugboat barge towing operations.
Dredging operations are expected to be limited to 1-2 months per year over a 9 year period. Dredging will occur 24 hours per day, 7 days per week.
Kent Island vegetation debris barge trips to Bodega Bay are treated as equivalent to 3 additional SFDODS round trips for purposes of estimating emissions from harbor tugs.

SUMMARY OF EMISSIONS FROM LAND-BASED EXCAVATION ACTIVITIES, BOLINAS LAGOON RESTORATION PROJECT

PROJECT ELEMENT OR ALTERNATIVE	SITE ACREAGE	MATERIAL QUANTITY, CUBIC YARDS		ESTIMATED EMISSIONS, TONS				
		CLEARING	EXCAVATION	ROG	NOx	CO	SOx	PM10
PINE GULCH CREEK, REDUCED ALTERNATIVE	8.6	864		0.11	0.94	0.44	0.08	0.14
	8.6		9,550	0.11	1.33	0.52	0.12	0.21
SUBTOTAL				**0.22**	**2.28**	**0.96**	**0.20**	**0.35**
PINE GULCH CREEK, EXPANDED ALTERNATIVE	11	11,304		0.37	3.27	1.46	0.28	0.40
	11		34,750	0.40	4.79	1.87	0.42	0.77
SUBTOTAL				**0.77**	**8.06**	**3.33**	**0.70**	**1.17**
KENT ISLAND	124	3,840	0	0.71	6.14	2.89	0.51	0.94
HIGHWAY 1 FILLS	3.25	0	4,800	0.02	0.28	0.10	0.03	0.04
DIPSEA ROAD FILLS	8	0	37,700	0.18	2.17	0.78	0.20	0.35
TOTALS, REDUCED ALTERNATIVE	**143.85**	**4,704**	**52,050**	**1.13**	**10.87**	**4.73**	**0.93**	**1.68**
TOTALS, EXPANDED ALTERNATIVE	**146.25**	**15,144**	**77,250**	**1.67**	**16.65**	**7.10**	**1.44**	**2.50**

Notes:

ROG = reactive organic gases
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter; includes both equipment exhaust emissions and fugitive dust emissions
Equipment exhaust emission rates based on U.S. EPA, 1991, Nonroad Engine and Vehicle Emissions Study (ANR-443).
Land-based excavation work is expected to be limited to daytime hours, but may include both weekdays and weekends.
The available work season is limited to about 2 months each year. The land-based excavation portion of the project would require 3 to 4 years to complete, but might be spread over a longer period for better coordination with dredging activities.

SUMMARY OF EMISSIONS FROM HEAVY TRUCK TRAFFIC

INPUT PARAMETERS:	RIPARIAN ALTERNATIVE	ESTUARINE ALTERNATIVE
TRUCK LOADS FOR VEGETATION	392	1,262
TRUCK LOADS FOR EXCAVATION	4,338	6,438
VEHICLE TRIPS PER LOAD	2	2
CUMULATIVE TRUCK TRIPS	9,460	15,400
MEAN VMT PER VEHICLE TRIP	30.45	30.45
TOTAL DAYS OF ACTIVITY	152	198
YEARS WITH ACTIVITY	4	4
ADDED VMT ON ACTIVE DAYS	1,895	2,368
ANNUAL ADDED TRAFFIC VMT	72,014	117,233
CUMULATIVE EMISSION ESTIMATES:	**CUMULATIVE TONS**	**CUMULATIVE TONS**
ROG	0.71	1.16
CO	2.95	4.81
NOx	3.40	5.53
SOx	0.18	0.30
PM10	1.56	2.54
ANNUAL EMISSION ESTIMATES:	**TONS PER YEAR**	**TONS PER YEAR**
ROG	0.18	0.29
CO	0.74	1.20
NOx	0.85	1.38
SOx	0.05	0.07
PM10	0.39	0.63

ROG = Reactive Organic Gases (ozone and PM10 precursors)
NOx = Nitrogen Oxides (Nitrogen Dioxide plus Nitric Oxide; ozone, NO2, and PM10 precursors)
CO = Carbon Monoxide
SOx = Sulfur Oxides (mostly Sulfur Dioxide and Sulfur Trioxide; SO2 and PM10 precursors)
PM10 = Inhalable Particulate Matter [Note: the "10" in PM10 is a certified sampler 50% collection efficiency size, not an upper size limit]
PM10 emission rates include direct exhaust, tire and brake wear, and resuspended roadway dust.

SUMMARY OF CONSTRUCTION SITE NOISE IMPACTS

EQUIPMENT TYPES ANALYZED

EQUIPMENT TYPE	MAXIMUM ITEMS IN USE AT ONE TIME	REFERENCE dBA LEVEL	REFERENCE DISTANCE (feet)	ABSORPTION COEFFICIENT (dB/100 meters)	% OPERATING TIME DURING ACTIVE HOURS	HOURS PER DAY WITH USE	OPERATING HOURS/DAY PER ITEM	ACTIVITY PERIOD STARTING TIME	ACTIVITY PERIOD ENDING TIME
Tracked Dozer	4	85	50	0.75	85%	8	6.80	8 AM	5 PM
Wheeled Loader	4	80	50	0.50	75%	8	6.00	8 AM	5 PM
Wood Chipper	4	91	50	0.75	65%	8	5.20	8 AM	5 PM
Forklift	1	80	50	0.50	65%	4	2.60	9 AM	5 PM
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		

SUMMARY OF KENT ISLAND VEGETATION CLEARING NOISE IMPACTS

RECEPTOR DISTANCES (feet)	CONSTRUCTION SITE NOISE IMPACTS (dBA)						
	Ld (7 am - 7 pm)	Le (7 pm - 10 pm)	Ln (10 pm - 7 am)	Leq(max1)	Leq(24)	Ldn	CNEL
50	94.9	0.0	0.0	96.7	91.9	91.9	91.9
100	88.8	0.0	0.0	90.6	85.8	85.8	85.8
200	82.6	0.0	0.0	84.4	79.6	79.6	79.6
300	78.9	0.0	0.0	80.7	75.9	75.9	75.9
400	76.2	0.0	0.0	78.0	73.2	73.2	73.2
500	74.0	0.0	0.0	75.8	71.0	71.0	71.0
600	72.2	0.0	0.0	74.0	69.2	69.2	69.2
700	70.6	0.0	0.0	72.4	67.6	67.6	67.6
800	69.3	0.0	0.0	71.1	66.3	66.3	66.3
900	68.0	0.0	0.0	69.8	65.0	65.0	65.0
1,000	66.9	0.0	0.0	68.7	63.9	63.9	63.9
1,500	62.3	0.0	0.0	64.1	59.3	59.3	59.3
2,000	58.7	0.0	0.0	60.5	55.7	55.7	55.7
2,500	55.6	0.0	0.0	57.4	52.6	52.6	52.6
3,000	53.0	0.0	0.0	54.8	50.0	50.0	50.0
4,000	48.3	0.0	0.0	50.1	45.3	45.3	45.3
5,280	43.1	0.0	0.0	44.9	40.1	40.1	40.1
7,500	35.3	0.0	0.0	37.2	32.3	32.3	32.3
9,000	30.6	0.0	0.0	32.4	27.6	27.6	27.6
10,560	26.0	0.0	0.0	27.9	23.0	23.0	23.0

Ld = daytime average noise level (7 am - 7 pm)
Le = evening average noise level (7 pm - 10 pm)
Ln = nighttime average noise level (10 pm - 7 am)
Leq(max1) = highest hourly average noise level at the specified receptor distance
Leq(24) = 24-hour average noise level
Ldn = day-night average noise level (nighttime noise weighted by 10 dBA)
CNEL = commumity noise equivalent level (evening noise weighted by 5 dBA, nighttime noise weighted by 10 dBA)

SUMMARY OF CONSTRUCTION SITE NOISE IMPACTS

EQUIPMENT TYPES ANALYZED

EQUIPMENT TYPE	MAXIMUM ITEMS IN USE AT ONE TIME	REFERENCE dBA LEVEL	REFERENCE DISTANCE (feet)	ABSORPTION COEFFICIENT (dB/100 meters)	% OPERATING TIME DURING ACTIVE HOURS	HOURS PER DAY WITH USE	OPERATING HOURS/DAY PER ITEM	ACTIVITY PERIOD STARTING TIME	ACTIVITY PERIOD ENDING TIME
Tracked Dozer	4	85	50	0.75	85%	8	6.80	8 AM	5 PM
Wheeled Loader	4	80	50	0.50	75%	8	6.00	8 AM	5 PM
Wood Chipper	4	91	50	0.75	65%	8	5.20	8 AM	5 PM
Off-Road Heavy Truck	4	85	50	0.32	25%	8	2.00	8 AM	5 PM
Off-Road Heavy Truck	1	85	50	0.32	25%	2	0.50	10 AM	2 PM
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		

SUMMARY OF PINE GULCH CREEK VEGETATION CLEARING NOISE IMPACTS - ESTUARINE ALTERNATIVE

RECEPTOR DISTANCES (feet)	CONSTRUCTION SITE NOISE IMPACTS (dBA) Ld (7 am - 7 pm)	Le (7 pm - 10 pm)	Ln (10 pm - 7 am)	Leq(max1)	Leq(24)	Ldn	CNEL
50	95.2	0.0	0.0	97.0	92.2	92.2	92.2
100	89.1	0.0	0.0	90.9	86.1	86.1	86.1
200	82.9	0.0	0.0	84.7	79.9	79.9	79.9
300	79.2	0.0	0.0	81.0	76.2	76.2	76.2
400	76.5	0.0	0.0	78.3	73.5	73.5	73.5
500	74.3	0.0	0.0	76.1	71.3	71.3	71.3
600	72.5	0.0	0.0	74.3	69.5	69.5	69.5
700	71.0	0.0	0.0	72.8	68.0	68.0	68.0
800	69.6	0.0	0.0	71.4	66.6	66.6	66.6
900	68.4	0.0	0.0	70.2	65.4	65.4	65.4
1,000	67.3	0.0	0.0	69.1	64.2	64.2	64.2
1,500	62.7	0.0	0.0	64.5	59.7	59.7	59.7
2,000	59.2	0.0	0.0	61.0	56.1	56.1	56.1
2,500	56.2	0.0	0.0	58.0	53.2	53.2	53.2
3,000	53.6	0.0	0.0	55.5	50.6	50.6	50.6
4,000	49.1	0.0	0.0	51.0	46.1	46.1	46.1
5,280	44.2	0.0	0.0	46.2	41.2	41.2	41.2
7,500	37.2	0.0	0.0	39.2	34.2	34.2	34.2
9,000	33.2	0.0	0.0	35.3	30.2	30.2	30.2
10,560	29.4	0.0	0.0	31.6	26.4	26.4	26.4

Ld = daytime average noise level (7 am - 7 pm)
Le = evening average noise level (7 pm - 10 pm)
Ln = nighttime average noise level (10 pm - 7 am)
Leq(max1) = highest hourly average noise level at the specified receptor distance
Leq(24) = 24-hour average noise level
Ldn = day-night average noise level (nighttime noise weighted by 10 dBA)
CNEL = commumity noise equivalent level (evening noise weighted by 5 dBA, nighttime noise weighted by 10 dBA)

SUMMARY OF CONSTRUCTION SITE NOISE IMPACTS

EQUIPMENT TYPES ANALYZED

EQUIPMENT TYPE	MAXIMUM ITEMS IN USE AT ONE TIME	REFERENCE dBA LEVEL	REFERENCE DISTANCE (feet)	ABSORPTION COEFFICIENT (dB/100 meters)	% OPERATING TIME DURING ACTIVE HOURS	HOURS PER DAY WITH USE	OPERATING HOURS/DAY PER ITEM	ACTIVITY PERIOD STARTING TIME	ACTIVITY PERIOD ENDING TIME
Tracked Dozer	2	85	50	0.75	85%	8	6.80	8 AM	5 PM
Wheeled Loader	2	80	50	0.50	75%	8	6.00	8 AM	5 PM
Wood Chipper	2	91	50	0.75	65%	8	5.20	8 AM	5 PM
Off-Road Heavy Truck	1	85	50	0.32	25%	4	1.00	9 AM	5 PM
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		
not used	0	0	0	0.00	0%	0	0.00		

SUMMARY OF PINE GULCH CREEK VEGETATION CLEARING NOISE IMPACTS - RIPARIAN ALTERNATIVE

RECEPTOR DISTANCES (feet)	CONSTRUCTION SITE NOISE IMPACTS (dBA)						
	Ld (7 am - 7 pm)	Le (7 pm - 10 pm)	Ln (10 pm - 7 am)	Leq(max1)	Leq(24)	Ldn	CNEL
50	92.0	0.0	0.0	93.8	89.0	89.0	89.0
100	85.9	0.0	0.0	87.7	82.9	82.9	82.9
200	79.6	0.0	0.0	81.5	76.6	76.6	76.6
300	75.9	0.0	0.0	77.7	72.9	72.9	72.9
400	73.2	0.0	0.0	75.0	70.2	70.2	70.2
500	71.0	0.0	0.0	72.9	68.0	68.0	68.0
600	69.2	0.0	0.0	71.1	66.2	66.2	66.2
700	67.7	0.0	0.0	69.5	64.7	64.7	64.7
800	66.3	0.0	0.0	68.2	63.3	63.3	63.3
900	65.1	0.0	0.0	66.9	62.1	62.1	62.1
1,000	63.9	0.0	0.0	65.8	60.9	60.9	60.9
1,500	59.3	0.0	0.0	61.2	56.3	56.3	56.3
2,000	55.8	0.0	0.0	57.6	52.7	52.7	52.7
2,500	52.7	0.0	0.0	54.6	49.7	49.7	49.7
3,000	50.1	0.0	0.0	52.0	47.1	47.1	47.1
4,000	45.4	0.0	0.0	47.4	42.4	42.4	42.4
5,280	40.3	0.0	0.0	42.4	37.3	37.3	37.3
7,500	32.8	0.0	0.0	35.0	29.7	29.7	29.7
9,000	28.2	0.0	0.0	30.7	25.2	25.2	25.2
10,560	24.0	0.0	0.0	26.6	21.0	21.0	21.0

Ld = daytime average noise level (7 am - 7 pm)
Le = evening average noise level (7 pm - 10 pm)
Ln = nighttime average noise level (10 pm - 7 am)
Leq(max1) = highest hourly average noise level at the specified receptor distance
Leq(24) = 24-hour average noise level
Ldn = day-night average noise level (nighttime noise weighted by 10 dBA)
CNEL = commumity noise equivalent level (evening noise weighted by 5 dBA, nighttime noise weighted by 10 dBA)

RECORD OF NONAPPLICABILITY FOR THE BOLINAS LAGOON ECOSYSTEM RESTORATION PROJECT, ESTUARINE ALTERNATIVE

The U.S. Army Corps of Engineers proposes to support the Estuarine Alternative for the Bolinas Lagoon Ecosystem Restoration Project in Marin County, CA. The proposed project includes dredging and land based excavation activities to remove sediment and establish better tidal flow in the Bolinas Lagoon.

Bolinas Lagoon is located within the San Francisco Bay Area Air Basin. in Marin County. The entire San Francisco Bay Area is designated as an ozone nonattainment area (without any severity classification). Urbanized portions of the San Francisco Bay Area, including the project area, are designated as a maintenance area for carbon monoxide. The San Francisco Bay Area is either unclassified or in attainment for all other federal ambient air quality standards.

The proposed action has been evaluated for compliance with Section 176(c) of the Clean Air Act (42 USC 7506) and with the U.S. Environmental Protection Agency (EPA) general conformity rule promulgated at 40 CFR Part 93.

Proposed construction activities have been the subject of a joint EIS/EIR. Construction activity is planned to be sequenced over a nine year construction period. Annual dredging and excavation activities are expected to be limited to a one to two month period during the summer or fall during each year of the program. Annual average dredging and excavation activity emissions are estimated in the EIS/EIR as 3.6 tons or reactive organic compound emissions, 61.1 tons of nitrogen oxide emissions, and 14.6 tons of carbon monoxide emissions. These emission quantities are less than the relevant de minimis emission levels for the ozone nonattainment area and the carbon monoxide maintenance area (100 tons per year for each relevant pollutant or pollutant precursor).

Pursuant to 40 CFR 93.153(c)(1), I find that the requirements of the EPA general conformity rule are not applicable to the proposed Corps of Engineers action.

Signature: _____

Date: _____